

# Global Tropospheric Experiment Transport and Chemical Evolution over the Pacific (TRACE- P) Langley ASDC Data Set Document



## Summary

This document provides information on data products obtained during the GTE TRACE-P atmospheric science expedition conducted over the western Pacific during February, March and April, 2001. The objective of the mission was to determine the chemical composition of the Asian outflow and evolution over the western Pacific. Measurements were made primarily by investigators' instruments located on the NASA DC-8 and WFF P-3B airplanes. Also provided are a list of principal investigators and references for measurement techniques and publications.

This document provides information for the following data sets:

## DC-8 Aircraft

Where XX indicates the flight number.

<b>gte_tracep_dc8flight_institu_XX.zip:</b>	Chemical & Aerosol In Situ Measurements
<b>gte_tracep_dc8flight_project_XX.zip:</b>	Aircraft Ephemeris & Meteorological Data
<b>gte_tracep_merged_dc8_fltXX.zip:</b>	Merged Chemical, Aerosol & Ephemeris Data Files
<b>gte_tracep_beoz1dXX.zip:</b>	DIAL Ozone Profiles
<b>gte_tracep_bevis1dXX.zip:</b>	DIAL Visible Aerosol Scattering
<b>gte_tracep_betc1dXX.zip:</b>	DIAL Tropopause Height and Ozone Column
<b>gte_tracep_bewd1dXX.zip:</b>	DIAL Depolarization Aerosol Scattering
<b>gte_tracep_bedp1dXX.zip:</b>	DIAL Visible Aerosol Depolarization
<b>gte_tracep_beir1dXX.zip:</b>	DIAL Aerosol Scattering 1064nm
<b>gte_tracepd8_cld_index.zip:</b>	Cloud Index
<b>gte_tracep_dc8_sat_images_trkmXX.zip:</b>	IR, Visible, and Water Vapor Satellite Images
<b>gte_tracep_dc8_traj_images_fltXX.zip:</b>	Plot of Backward Air mass Trajectories
<b>gte_tracep_dc8_traj_tab_fltXX.zip:</b>	Tabulated Data of Backward Air mass Trajectories

## P3-B Aircraft

Where XX indicates the flight number.

<b>gte_tracep_p3bflight_institu_fltXX.zip:</b>	P3-B Chemical & Aerosol In Situ Measurements
<b>gte_tracep_p3bflight_project_fltXX.zip:</b>	P3-B Aircraft Ephemeris & Meteorological Data
<b>gte_tracep_merged_p3b_fltXX.zip:</b>	P3-B Merged Chemical, aerosol & Ephemeris Data Files
<b>gte_tracep_tams1pXX.zip:</b>	P3-B 10hz Turbulent air motion measurements
<b>gte_tracep_p3b_sat_images_trkmXX.zip:</b>	IR, Visible, and Water Vapor Satellite Images
<b>gte_tracep_p3b_traj_images_fltXX.zip:</b>	Plot of Backward Air mass Trajectories
<b>gte_tracep_p3b_traj_tab_fltXX.zip:</b>	Tabulated Data of Backward Air mass Trajectories

## TRACE-P Ancillary Data

<b>gte_tracep_ftir_ground.zip:</b>	Ground Based FTIR Measurements of C <sub>2</sub> H <sub>2</sub> , C <sub>2</sub> H <sub>6</sub> , CO, and HCN
<b>gte_tracep_prc_plots_2001mmdd-2001mmdd.zip:</b>	Ground Based Observations in PRC
<b>gte_tracep_2001mmdd.zip:</b>	Satellite Data Products During TRACE-P Mission Period
<b>gte_tracep_ozonesondes_Kagoshima.zip:</b>	Data from Ozone Sonde Launches at Kagoshima, Japan (other files for launches at Naha, Sapporo, and Tateno, Japan; Cheju, Korea; Hilo, Hawaii, USA; Hong Kong, PRC; Taipei, Taiwan; Trinidad Head, CA, USA)

## Acknowledgment

NASA funded the investigators involved in the TRACE-P mission. The funded investigators, their organization, and their grant, agreement or contract number was:

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	D. Blake	U of California Irvine	NCC-1-413
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	B. Brune	Pennsylvania State U	NCC-1-414
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	A. Clarke	U of Hawaii	NCC-1-416
	F. Eisele	Georgia Tech	NCC-1-421
	F. Flocke	NCAR	NCC-1-423
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## 1. Collection Overview

### a. Collection Contents

Aircraft data sets are available for each investigation for each flight. Ground-based data are usually available on a daily basis. Airborne measurements were typically obtained at constant altitude over the Pacific Ocean during the transit flights (i.e. "survey" flights), and over multi-altitudes closer to Asia during flight from the intensive sites. Flight missions were conducted during TRACE-P from February 24, through April 10, 2001. Flight dates, takeoff and landing times and sites, and flight tracks and profiles are shown in Jacob et al., [2003]. The duration, altitude range, ascent and descent rate, and flight path for each mission varied depending on mission objectives and environmental conditions. Ground-based measurements were made at sites also shown in Jacob et al., [2003]. The automated ground sites provided daily measurements during the time frame when airborne measurements were being made and weekly averaged samples before and after. Further information about the measurement region and time frame may be found in the Journal of Geophysical Research, Vol. 108, No. 20, October 27, 2003.

## Data Set Introduction

This data collection contains 12 separate data sets. These include the atmospheric chemistry, meteorological and navigational data recorded aboard the NASA DFRC DC-8 and WFF P-3B airborne laboratories and data obtained from surface level sites.

## Summary of Data Sets

### DC-8 Aircraft:

Where XX indicates the flight number.

**gte\_tracep\_dc8flight\_insitu\_XX.zip** - Chemical & Aerosol In Situ Measurements  
**gte\_tracep\_dc8flight\_project\_XX.zip** - Aircraft Ephemeris & Meteorological Data  
**gte\_tracep\_merged\_dc8\_fltXX.zip** - Merged Chemical, Aerosol & Ephemeris Data Files  
**gte\_tracep\_beoz1dXX.zip** - DIAL Ozone Profiles  
**gte\_tracep\_bevs1dXX.zip** - DIAL Visible Aerosol Scattering  
**gte\_tracep\_betc1dXX.zip** - DIAL Tropopause Height and Ozone Column  
**gte\_tracep\_bewd1dXX.zip** - DIAL Depolarization Aerosol Scattering  
**gte\_tracep\_bedp1dXX.zip** - DIAL Visible Aerosol Depolarization  
**gte\_tracep\_beir1dXX.zip** - DIAL Aerosol Scattering 1064nm  
**gte\_tracepdc8\_cld\_index.zip** - Cloud Index  
**gte\_tracep\_dc8\_sat\_images\_trkmXX.zip** - IR, Visible, and Water Vapor Satellite Images  
**gte\_tracep\_dc8\_traj\_images\_fltXX.zip** - Plot of Backward Air mass Trajectories  
**gte\_tracep\_dc8\_traj\_tab\_fltXX.zip** - Tabulated Data of Backward Air mass Trajectories

### P3-B Aircraft:

Where XX indicates the flight number.

**gte\_tracep\_p3bflight\_insitu\_fltXX.zip** - P3-B Chemical & Aerosol In Situ Measurements  
**gte\_tracep\_p3bflight\_project\_fltXX.zip** - P3-B Aircraft Ephemeris & Meteorological Data  
**gte\_tracep\_merged\_p3b\_fltXX.zip** - P3-B Merged Chemical, aerosol & Ephemeris Data Files  
**gte\_tracep\_tams1pXX.zip** - P3-B 10hz Turbulent air motion measurements  
**gte\_tracep\_p3b\_sat\_images\_trkmXX.zip** - IR, Visible, and Water Vapor Satellite Images  
**gte\_tracep\_p3b\_traj\_images\_fltXX.zip** - Plot of Backward Air mass Trajectories  
**gte\_tracep\_p3b\_traj\_tab\_fltXX.zip** - Tabulated Data of Backward Air mass Trajectories



## **TRACE-P Ancillary Data:**

**gte\_tracep\_ftir\_ground.zip** - Ground Based FTIR Measurements of C<sub>2</sub>H<sub>2</sub>, C<sub>2</sub>H<sub>6</sub>, CO, and HCN

**gte\_tracep\_prc\_plots\_2001mmdd-2001mmdd.zip** - Ground Based Observations in PRC

**gte\_tracep\_2001mmdd.zip** - Satellite Data Products During TRACE-P Mission Period

**gte\_tracep\_ozonesondes\_Kagoshima.zip** - Data from Ozone Sonde Launches at Kagoshima, Japan (other files for launches at Naha, Sapporo, and Tateno, Japan; Cheju, Korea; Hilo, Hawaii, USA; Hong Kong, PRC; Taipei, Taiwan; Trinidad Head, CA, USA)

The preceding data sets are available from the [ASDC GTE Data and Information page](#). See the [GTE home page](#) for additional description of the TRACE-P field mission.

## **b. Related Data Collections**

TRACE-P investigators have individually reported the results of their investigations in the Journal of Geophysical Research, Vol. 108, No. 20 and 21, October 27 and November 16, 2003.

There are data sets available from the Langley ASDC and from the GTE Home Page for 13 other GTE missions conducted from 1983 to 2001. See the [GTE home page](#) and the [ASDC GTE Data and Information page](#) for a description of the available data.

## **c. Title of Investigation**

**Global Tropospheric Experiment Transport and Chemical Evolution over the Pacific (TRACE-P)**

## **d. Investigator Name and Title**

If the person is known to be retired, deceased or no longer at the organization originally responsible for the investigation, it is noted and the contact information may be omitted. The contact information provided was current during the mission, but may no longer be current.

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Tropospheric Modeling Studies of TRACE-P Data: Investigation of the HOx/NOx/O3 Photochemical System and its Coupling to Sulfur/Aerosol Species	Douglas Davis Georgia Institute of Technology School of Earth and Atmospheric Sciences Room 108 221 Bobby Dodd Way Atlanta GA 30332-0340 Telephone: 404-894-9565 E-mail: <a href="mailto:dd16@prism.gatech.edu">dd16@prism.gatech.edu</a>
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Regional Chemistry from Global CTMs with EC-Modeled Met-fields for the TRACE-P Mission	Michael J. Prather University of California-Irvine Earth System Science Department Irvine CA 92697-3100 Telephone: 949-824-5838 E-mail: <a href="mailto:mprather@uci.edu">mprather@uci.edu</a>
Tracer Transport during TRACE-P: Flight Planning and Interpretation with Satellite Maps, Ozone Profiles and Trajectory-based Analysis Tools	Anne Thompson NASA Goddard Space Flight Center Code 916 Bldg. 33, Room E417 Greenbelt MD 20771 Telephone: 301-286-2629 E-mail: <a href="mailto:anne.m.thompson@nasa.gov">anne.m.thompson@nasa.gov</a>
SAGE II Aerosol and Ozone Measurements Support for the TRACE P Field Experiment	Charles R. Trepte NASA Langley Research Center Mail Stop 475 Hampton VA 23681 Telephone: 757-864-5836



## e. Technical Contact Information

The following persons have either more specialized knowledge about the data in the data sets or in their field or general knowledge about the mission, its execution and the data sets. Where a person is noted as being retired, the contact information given was current during the mission and the person may no longer be available through this location.

Investigator or Knowledge Area	Investigator and Contact Information	
Measurements for DMS, SO <sub>2</sub> on P-3B	Donald C. Thornton Drexel University Department of Chemistry 32 <sup>nd</sup> and Chestnut Street Philadelphia PA 19104	
TRACE-P Mission Scientist and Deputy Mission Scientist	Daniel Jacob and James Crawford (see prior listings)	
TRACE -P Program Manager	Vickie S. Connors (no longer at NASA) NASA Langley Research Center	
TRACE-P Project Manager	Richard J. Bendura (retired) NASA Langley Research Center	
TRACE-P Mission Meteorologists	Reginald Newell (see prior listing under Modelers section)	Henry Fuelberg (see prior listing under Modelers section)
DC-8 Aircraft Manager	Darrell Winfield (no longer at NASA) Walter Klein NASA Dryden Flight Research Center MS DAOF.S142 Edwards CA 93523-0273 Telephone: 661-816-9502 E-mail: <a href="mailto:walter.e.klein@nasa.gov">walter.e.klein@nasa.gov</a>	Airborne Science Program Office MS D1623H Edwards, CA 93523-0273 Phone: (661) 276-7453
P-3B Aircraft Manager	Richard Bradford (retired)	Wallops Flight Facility Aircraft Office NASA Wallops Flight Facility Wallops Island, VA 23337-5099 Telephone: 757-824-1529
TRACE-P Logistics	Mike Cadena SAIC One Enterprise Parkway, Suite 300 Hampton VA 23666 Telephone: 757-827-4860 E-mail: <a href="mailto:michael.j.cadena@nasa.gov">michael.j.cadena@nasa.gov</a>	Erika Harper SAIC One Enterprise Parkway, Suite 300 Hampton VA 23666
TRACE-P Experiment Integration	<b>DC-8:</b> James L. Raper, Sr. (retired) NASA Langley Research Center	<b>P-3B:</b> John G. Wells (retired) NASA Langley Research Center
GTE/TRACE-P Webmaster	P. Kay Costulis MS 158 NASA Langley Research Center Hampton VA 23681-2199 Telephone: 757-864-1943 E-mail: <a href="mailto:p.k.costulis@nasa.gov">p.k.costulis@nasa.gov</a>	

## 2. APPLICATIONS AND DERIVATION

Potential usage and applications of the described data sets can be seen in the articles that comprise the Journal of Geophysical Research TRACE-P Special Section (Vol.108, No. 20 and 21, October 27 and November 16, 2003) and the Fall 2002 AGU TRACE-P Special Session(s).

### a. Calculated Variables

For convenience of the users, the calculated variables below are provided.



**Mach Number, M:**

$$M = \sqrt{5 * \left[ \left( \frac{Q_c}{P_s} + 1 \right)^{\frac{2}{\gamma}} - 1 \right]}$$

M = Mach Number  
 Ps = Static Pressure  
 Qc = Differential Pressure

**Static Air Temperature, Ts:**

$$T_s (\text{°K}) = \frac{T_t}{1 + M^2 * \left( \frac{\gamma - 1}{2} \right)}$$

Ts = Static Air Temperature (°K)  
 Tt = Total Air Temperature (°K)  
 γ = 1.4, ratio of specific heat of air at constant pressure and volume

**True Air Speed, TAS:**

$$TAS(\text{kts}) = M * a = M * 38.96695 * \sqrt{T_s}$$

TAS = True Air Speed (knots)  
 Ts = Static Air Temperature (°K)  
 M = Mach Number  
 a = Speed of Sound

**Potential Temperature, θ:**

$$\theta (\text{°K}) = T_s * \left( \frac{1000}{P_s} \right)^{0.2857142}$$

θ = Potential Temperature (°K)  
 Ts = Static Air Temperature (°K)  
 Ps = Static Pressure (mb)

**Vapor Pressure, e :**

$$e_{\text{water}} (\text{mb}) = [1.0007 + (3.46 * 10^{-6} * P_s)] * 6.1121 * \text{EXP}[17.502 * T/(240.97 + T)]$$

$$e_{\text{ice}} (\text{mb}) = [1.0003 + (4.18 * 10^{-6} * P_s)] * 6.1115 * \text{EXP}[22.452 * T/(272.55 + T)]$$

e = Partial Pressure of Water Vapor (mb)

Ps = Static Pressure (mb)

T = Static Air Temperature (°C) for Saturation Vapor Pressure

or

T = Dew/Frost Point (°C) for Partial Pressure of Water Vapor

Note:

1. ProjDP of zero or greater should be used to derive the partial pressure of water vapor w.r.t water ( $e_{\text{water}}$ ) and the ProjDP less than zero should be used to derive the partial pressure of water vapor w.r.t ice ( $e_{\text{ice}}$ ).
2. StatTempDegC and ProjDP parameters recorded in the P-3B data set are substituted to calculate saturation vapor pressure and partial pressure of water vapor, respectively.
3. TSDEGC and ProjDP parameters recorded in the DC-8 data set are substituted to calculate saturation vapor pressure and partial pressure of water vapor, respectively. Also notice in the DC-8 data set there is a redundant static air temperature measurement, TSCALC, which is calculated by DADS. Although TSDEGC and TSCALC track closely they can diverge by ? 1° at the low and high ends of the measurement range.

**Specific Humidity, q:**

$$q(\text{g/kg}) = \frac{0.622 * 10^3 * e}{(P_s - 0.377e)}$$

$$q(\text{ppmw}) = \frac{0.622 * 10^6 * e}{(P_s - 0.377e)}$$

**Mixing Ratio, r:**

$$r(\text{g/kg}) = \frac{0.622 * 10^3 * e}{(P_s - e)}$$

$$r(\text{ppmw}) = \frac{0.622 * 10^6 * e}{(P_s - e)}$$

Note:

ppmv = 1.608 \* ppmw



ppmw = 0.622 \* ppmv

#### Relative Humidity, %:

w.r.t. water,

$$RH_{\text{water}} = \frac{e_{\text{water}}}{e_{S_{\text{water}}}} * 100$$

w.r.t. ice,

$$RH_{\text{ice}} = \frac{e_{\text{ice}}}{e_{S_{\text{ice}}}} * 100$$

#### b. Graphs and Plots:

Interested readers should see the Journal of Geophysical Research, Vol. 108, No. 20 and 21, October 27 and November 16, 2003, and documents referenced therein, for plots and the results of analysis of data.

### 3. DATA DESCRIPTION AND ACCESS

#### a. Format

See the [GTE Data Format Document](#).

#### b. Data Organization

##### Granularity

A general description of data granularity as it applies to the IMS appears in the [EOSDIS Glossary](#). Aircraft data sets are available for each individual investigation for each flight through the [GTE home page](#) and for each flight (all investigation) from the [ASDC GTE Data and Information page](#). Surface level data are available on a daily basis from both sites.

#### c. Data Collection Status and Plans

All data for the TRACE-P mission is contained in the archive. The only additional data products anticipated relevant to TRACE-P are  $^{210}\text{Pb}$  from Robert Talbot (University of New Hampshire) and will be added to the archive when received by the GTE project office.

#### d. Data Access

This data is available online or on a CD-ROM via the LaRC ASDC on the [GTE Data and Information Page](#) and from the [GTE data archive](#).

#### e. Data Archive Center

The [Atmospheric Science Data Center](#) at NASA Langley Research Center and the [GTE data archive](#).

#### Contacts for Data Center or Data Access Information:

User and Data Services Office

Atmospheric Science Data Center

MS 157D

Langley Research Center

Hampton, VA 23681 USA

Phone: 757-864-8656

Fax: 757-864-8807

E-mail: [support-asdc@earthdata.nasa.gov](mailto:support-asdc@earthdata.nasa.gov)

Internet: <http://eosweb.larc.nasa.gov>



## f. How to Cite the Data Collection

Publication of a portion(s) of the data archive should acknowledge the principal investigator(s) responsible for the data by referencing the appropriate manuscript in the Journal of Geophysical Research, Vol. 108, No. 20 and 21, October 27 and November 16, 2003.

## 4. DATA CHARACTERISTICS:

### a. Study Area

Airborne measurements were made predominately over the western Pacific Ocean. A more detailed description of the surface level environmental characteristics for the experiment region is provided in the individual papers for each investigation included in the Journal of Geophysical Research, Vol. 108, No. 20 and 21, October 27 and November 16, 2003. Additional information may be found in other publications authored by the principal investigators or on the [GTE home page](#).

### Spatial Coverage

TRACE-P geographic coverage for the intensive flights out of Hong Kong and Yokota Air Force, Japan was approximately 110E-160E and 10N to 50N. Additional information can be found in the TRACE-P mission overview paper, Jacob et al., [2003].

Flight missions were conducted during February, March and April 2001. Also shown are the takeoff and landing sites. The duration, altitude ranges, ascent and descent rate and flight path of each mission varied depending on the mission objectives and environmental (weather) conditions. The nominal airspeed ranged from greater than 480 knots (approximately 552 mph) at 13 km altitude for the DC-8 to greater than 130 knots (approximately 152 mph) at 7.7 km altitude.

Data Set Name	Min Lat	Max Lat	Min Lon	Max Lon
<b>DC-8 Aircraft:</b> <ul style="list-style-type: none"><li>• <a href="#">gte_tracep_dc8flig_ht_insitu_XX.zip</a> - Chemical &amp; Aerosol In Situ Measurements</li><li>• <a href="#">gte_tracep_dc8flig_ht_project_XX.zip</a> - Aircraft Ephemeris &amp; Meteorological Data</li><li>• <a href="#">gte_tracep_merge_d_dc8_fltXX.zip</a> - Merged Chemical, Aerosol &amp; Ephemeris Data Files</li><li>• <a href="#">gte_tracep_beoz1_dXX.zip</a> - DIAL Ozone Profiles</li><li>• <a href="#">gte_tracep_bevs1_dXX.zip</a> - DIAL Visible Aerosol Scattering</li><li>• <a href="#">gte_tracep_betc1d_XX.zip</a> - DIAL Tropopause Height and Ozone Column</li><li>• <a href="#">gte_tracep_bewd1_dXX.zip</a> - DIAL Depolarization Aerosol Scattering</li><li>• <a href="#">gte_tracep_bedp1_dXX.zip</a> - DIAL</li></ul>	0N	45N	105E	120W



Visible Aerosol Depolarization • <b>gte_tracep_beir1d</b> <b>XX.zip</b> - DIAL Aerosol Scattering 1064nm				
<b>P3-B Aircraft:</b>  • <b>gte_tracep_p3bflig</b> <b>ht_institu_fltXX.zip</b> - Chemical & Aerosol In Situ Measurements • <b>gte_tracep_p3bflig</b> <b>ht_project_fltXX.zi</b> <b>p</b> - Aircraft Ephemeris & Meteorological Data • <b>gte_tracep_merge</b> <b>d_p3b_fltXX.zip</b> - Merged Chemical, aerosol & Ephemeris Data Files • <b>gte_tracep_tams1</b> <b>pXX.zip</b> - 10hz Turbulent air motion measurements	0N	45N	105E	75W
<b>gte_tracep_dc8_traj_im</b> <b>ges_fltXX.zip</b> - Plot of Backward Air mass Trajectories <b>gte_tracep_dc8_traj_tab</b> <b>fltXX.zip</b> - Tabulated Data of Backward Air mass Trajectories	0N	45N	105E	120W
<b>gte_tracepdc8_cld_index.</b> <b>zip</b> - Cloud Index	10N	50N	110W	120W
<b>gte_tracep_p3b_traj_im</b> <b>ges_fltXX.zip</b> - Plot of Backward Air mass Trajectories <b>gte_tracep_p3b_traj_tab</b> <b>fltXX.zip</b> - Tabulated Data of Backward Air mass Trajectories	0N	45N	105E	75W
<b>gte_tracep_p3b_sat_im</b> <b>ges_trkmXX.zip</b> - IR, Visible, and Water Vapor Satellite Images <b>gte_tracep_2001mmdd.zi</b> <b>p</b> - Satellite Data Products During TRACE-P Mission Period	0N	45N	105E	120W
<b>gte_tracep_prc_plots_20</b> <b>01mmdd-2001mmdd.zip</b> - Ground Based Observations in PRC	87.6N	126.6N	20.0E	45.7E
<b>gte_tracep_ftir_ground.zi</b> <b>p</b> - Ground Based FTIR Measurements of C <sub>2</sub> H <sub>2</sub> , C <sub>2</sub> H <sub>6</sub> , CO, and HCN	36.2N	44.4N	140.1E	143.8E

Ozonesonde Launch Site	Latitude	Longitude
Trinidad Head, CA	40.8N	124.2W

Hilo, Hawaii	19.4N	155.0W
Cheju, Korea	33.5N	126.5E
Hong Kong Observatory	22.3N	114.2E
Kagoshima, Japan	31.6N	130.6E
Naha, Japan	26.2N	127.7E
Sapporo, Japan	43.1N	141.3E
Tateno, Japan	36.1N	140.1E
Taipei, Taiwan	25.0N	121.4E

## Spatial and Temporal Resolution

Resolution varies for each measurement. See Kleb and Scott, [2003a] and [2003b].

See the next section Grid Description for information about the meteorological trajectories. Ozonesondes were launched from nine ground stations.

Ozone data are found at:

- [ftp site for TRACEP/OZONESONDDES/](#)
- [GTE TRACE-P Ozonesondes List](#)
- [Langley ASDC GTE Data and Information](#)

Satellite images are found at:

- [ftp site for TRACEP/IMAGES/](#)
- [ftp site for TRACEP/DC8-AIRCRAFT/FLIGHT TRACKS/](#)
- [Langley ASDC GTE Data and Information](#)

## Grid Description

The meteorological trajectories utilized global gridded meteorological analyses prepared by the European Centre for Medium-Range Weather Forecasts (ECMWF) [Bengtsson, 1985; Hollingsworth et al., 1986, ECMWF, 1995]. The data were available four times daily (0000, 0600, 1200, and 1800 UTC) at 60 vertical levels with a T319 spherical harmonic triangular truncation, interpolated to a  $1^\circ \times 1^\circ$  latitude-longitude horizontal grid. The five-day backward trajectories were calculated using a kinematic model, i.e., employing u, v, and w wind components from the ECMWF analyses. Additional details about the trajectory model are given in Fuelberg et al. [1996, 1999, 2000]. Limitations of trajectories are described by Fuelberg et al. [2000], Maloney et al. [2001], Stohl [1995], and Stohl et al. [1998].

## b. Temporal Coverage

TRACE-P aircraft missions were conducted from February 24 through April 10, 2001. Temporal coverage for the DC-8 and P-3B data, meteorological trajectories, and the merged data is from February 24 through April 10, 2001. Ground site measurements and satellite image start dates and end dates are listed below. Ozonesondes were launched from nine ground stations and ozonesonde data are found at the [TRACEP OZONESONDDES FTP list](#) or [TRACEP Ozonesondes page](#). Visible, infrared, and water-vapor satellite images from GMS-5, GOES-8 and GOES-10 satellites at 4-km resolution were created using [McIDAS](#) software for the 2001 TRACE-P field mission. The images can be found at the [TRACEP DC8-AIRCRAFT FLIGHT TRACKS FTP list](#).

Data Set Description	Begin Date	End Date
GTE TRACEP DC8 Aircraft Results	2/26/2001	4/09/2001
GTE TRACEP P3B Aircraft Results	2/24/2001	4/10/2001
Backward air mass trajectories intersecting the DC-8 flight path	2/26/2001	4/09/2001



Cloud index	2/26/2001	4/03/2001
Data merges for the DC-8 data files	2/26/2001	4/09/2001
Backward air mass trajectories intersecting the P3-B flight path	2/24/2001	4/10/2001
Data merges for the P3-B data files	2/24/2001	4/10/2001
Satellite Data Products	2/24/2001	4/10/2001
Chinese Ground Sites	2/01/2001	4/30/2001
GTE FTIR Ground Observations	1/15/2001	6/15/2001
OZONESONDES	1/05/2000	12/27/2001

### c. Parameter or Variable

Not all of the parameters are in each data set granule. Also, the ranges vary between data sets and between granules within each data set. Species measured are given in Kleb and Scott, [2003a], [2003b].

#### Parameter Description

See Kleb and Scott, [2003a], [2003b], Jacob et al., [2003].

#### Unit of Measurement

The units of measure vary widely depending on species and measurement environment and are addressed in the individual data file header records.

#### Parameter Source

See Kleb and Scott, [2003a], [2003b], Jacob et al., [2003].

#### Parameter Range

See Kleb and Scott, [2003a], [2003b], Jacob et al., [2003].

#### Sample Data Record

The [GTE Data Format Document](#) contains examples of each data set type.

### d. Error Sources

The sources of error vary depending on species and measurement environment and are addressed in Kleb and Scott, [2003a], [2003b], the papers included in the TRACE-P special section of the Journal of Geophysical Research, Vol. 108, No. 20 and 21, October 27 and November 16, 2003, and/or papers referenced in that publication and readme files and/or header records associated with each data file.

## 5. USAGE GUIDANCE

### a. Known Problems with the Data

None reported for the current archive version. See the readme files and header records included with each data set for information provided by the responsible investigator.

### b. Future Modifications and Plans

The data sets submitted to the ASDC are considered final and no further updates are anticipated. However, modifications will be considered if requested by the investigators or otherwise justified.

## 6. ACQUISITION MATERIALS AND METHODS



Details of data acquisition and materials are addressed in the Fall 2002 AGU TRACE-P Special Session (s) and the papers contained in the Journal of Geophysical Research TRACE-P Special Section (Vol. 108, No. 20 and 21, October 27 and November 16, 2003).

## 7. REFERENCES

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## 8. ACRONYMS

[EOSDIS Acronyms](#) | [EOSDIS Glossary](#).

**AGU** - American Geophysical Union

**ACE** - Aerosol Characterization Experiment

**ASDC** - Atmospheric Science Data Center

**CMDL** - Climate Monitoring and Diagnostics Laboratory

**DFRC** - Dryden Flight Research Center

**ECMWF** - European Center for Medium-Range Weather Forecasts

**EOSDIS** - Earth Observing System Distributed Information System

**GMS** - Geostationary Meteorological Satellites

**GOES** - Geostationary Operational Environmental Satellites

**GTE** - Global Tropospheric Experiment

**IMS** - Information Management System

**LaRC** - Langley Research Center

**McIDAS** - Man computer Interactive Data Access System

**MOPITT** - Measurements Of Pollution In The Troposphere

**NASA** - National Aeronautics and Space Administration

**NAST** - NPOESS Atmospheric Sounder Testbed

**NCAR** - National Center for Atmospheric Research

**NOAA** - National Oceanic and Atmospheric Administration

**NPOESS** - National Polar-Orbiting Environmental Satellite System

**ProjDP** - Project Dew Point

**SHADOZ** - Southern Hemisphere ADditional OZonesondes

**TSCALC** - Static temperature, calculated by DADS

**TSDEGC** - Static temperature, measured directly, in Celsius

**TRACE-P** - Transport and Chemical Evolution over the Pacific

**WFF** - Wallops Flight Facility

## 9. Document Information

- **Creation Date:** November 2003

- **Revision Date:**

- **Review Date:**

- **Identification:**

- **Curator:**

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